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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,051	01/29/2001	Kazuhisa Shida	0941.65172	8505

24978 7590 10/20/2003

GREER, BURNS & CRAIN
300 S WACKER DR
25TH FLOOR
CHICAGO, IL 60606

EXAMINER	
UHLIR, NIKOLAS J	
ART UNIT	**PAPER NUMBER**
1773	9

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/772,051	SHIDA ET AL.
	Examiner	Art Unit
	Nikolas J. Uhlir	1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-18* is/are rejected.

7)☒ Claim(s) *17-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. This office action is in response to the amendment/arguments dated 8/04/03. The applicant's amendment to claim s 1, 8, and 16 to require the 2nd magnetic layer to be formed directly on the 1st magnetic layer is sufficient to overcome the previously applied prior art. Accordingly, the previous rejections of claims 1-13 and 15-18 under 35 U.S.C 103(a) are hereby withdrawn. However, the case is not in condition for allowance in light of the new prior art cited below.

Election/Restrictions

2. Claims 8-13, 15 and 18 are noted to contain nominal method steps. At this time restriction has not been required between the product claims 1-7 and 16 and the method claims 8-13 and 15 because the method claims do not recite any significant manipulative steps and therefore considered as part of the product claims. If the method claims are amended to contain significant method steps they may be subject to restriction based on original presentation.

Claim Objections

3. Claims 17-18 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In the instant case, Claim 17-18 requires the sum total of elements other than Cr in the 2nd underlayer to be larger than that of the 1st underlayer. Claims 5 and 12, upon which claims 17 and 18 are dependant, already require this limitation, as claim 5 is dependant

on claim 4 and claim 12 is dependant on claim 11, and claims 4 and 11 already require the second underlayer to have a larger sum total of elements other than the 1st underlayer. Correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, and 8-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al (US5772857).

6. Claim 1 requires a magnetic recording medium comprising a substrate, a magnetic layer including a CoCr based alloy and non-magnetic elements other the Cr, wherein the magnetic layer has a multilayer structure and is disposed on the substrate, wherein the multilayer structure is formed so as to have a 1st magnetic layer disposed above the substrate and a 2nd magnetic layer disposed directly on the 1st magnetic layer, wherein the 1st magnetic layer has a larger Cr content then the 2nd magnetic layer, and the 1st magnetic layer has a larger sum total content of non-magnetic elements other then Cr, wherein the non-magnetic elements other then Cr have a larger atomic radius than Co.

7. Zhang teaches a specific example of a magnetic recording medium that meets all of the applicant's claim 1 requirements. Specifically, example IV of Zhang teaches a magnetic recording medium, wherein a $Co_{76}Cr_{12}Pt_{10}Ta_2$ (subscripts are in atomic %) is formed on a substrate, and a $Co_{84}Cr_{10}Ta_6$ magnetic layer is formed directly on the $Co_{76}Cr_{12}Pt_{10}Ta_2$ magnetic layer (column 7, example 4, lines 40-49). It is clear that the 1st (lower) magnetic layer in Zhang contains a larger amount of Cr then the 2nd magnetic layer. Further, given that it is known in the art that Ta and Pt are non-magnetic elements having a larger atomic radius than Co, it is clear that the 1st magnetic layer of Zhang has a larger sum total of non-magnetic elements (12 atomic %) with a radius larger than the radium of Co, as compared to the 2nd magnetic layer (6 atomic %). Thus, the limitations of claim 1 are clearly anticipated by Zhang.

8. Claim 2 requires the 1st and 2nd magnetic layers to contain at least one non-magnetic element selected from the group consisting of Pt, Ta, W, and B. Zhang clearly anticipates this limitation as set forth above for claim 1.

9. Claim 8 requires essentially the same limitations as claim 1, except that it requires a generic method for forming the layers recited in claim 1 in the requisite order. The limitations of claim 8 are met by Zhang as set forth above for claim 1, as Example IV of Zhang would necessarily require the layers to be "formed" in the requisite order. Thus, as no other method limitations aside form the generic formation of the layers is required, the limitations of claim 8 are anticipated as set forth above for claim 1.

10. Claim 9 requires essentially the same limitations as claim 2, except that the generic method for forming the recited layers is required. The limitations of claim 9 are anticipated as set forth above for claim 2.

11. Claims 1-2, 8-9, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsuda et al. 9US6623873).

12. Claim 1 requires a magnetic recording medium comprising a substrate, a magnetic layer including a CoCr based alloy and non-magnetic elements other the Cr, wherein the magnetic layer has a multilayer structure and is disposed on the substrate, wherein the multilayer structure is formed so as to have a 1st magnetic layer disposed above the substrate and a 2nd magnetic layer disposed directly on the 1st magnetic layer, wherein the 1st magnetic layer has a larger Cr content then the 2nd magnetic layer, and the 1st magnetic layer has a larger sum total content of non-magnetic elements other then Cr, wherein the non-magnetic elements other then Cr have a larger atomic radius than Co.

13. Matsuda et al (Matsuda) teaches a specific example which anticipates all of the limitations of claim 1. Specifically, Matsuda teaches a magnetic recording medium comprising a substrate, a CrTi underlayer, a $CoCr_{21}Pt_{12}$ (subscripts are atomic %) magnetic layer on the CrTi underlayer, and a $CoCr_{19}Pt_8Ta_3$ magnetic layer formed directly on the $CoCr_{21}Pt_{12}$ layer (column 10, embodiment 2, lines 53-67). Thus all of the limitations of claim 1 are clearly anticipated by Matsuda.

14. Claim 2 requires the 1st and 2nd magnetic layers to contain at least one non-magnetic element selected from the group consisting of Pt, Ta, W, and B. Matsuda clearly anticipates this limitation as set forth above for claim 1.

15. Claims 8 and 9 require essentially the same limitations as claims 1-2, except that they require a generic method for forming the layers recited in claims 1-2 in the requisite order. The limitations of claims 8-9 are met by Matsuda as set forth above for claims 1-2, as embodiment 2 of Matsuda would necessarily require the layers to be "formed" in the requisite order. Thus, as no other method limitations aside form the generic formation of the layers is required, the limitations of claims 8-9 are anticipated as set forth above for claims 1-2.

16. Claim 16 requires a magnetic storage apparatus comprising a head and the media of claim 1. As set forth above for claim 1, Matsuda clearly teaches the media required by claim 16. Regarding the requirement of a head, Matsuda teaches an apparatus which utilizes a magnetic head to read the media at column 6, lines 36-55. Thus, Matsuda anticipates the limitations of claim 16.

Claim Rejections - 35 USC § 103

17. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

18. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US6623873).

19. Claims 3 requires the each magnetic layer required by the magnetic recording medium of claim 2 to contain between 8-15 atomic % Pt and 1-6 atomic % B.

20. Matsuda is relied upon as set forth above at sections 11-16 of this document with respect to the limitations of claims 1, 2, and 8. Regarding the limitations of claim 3, Matsuda teaches the formation of a magnetic recording medium having a first magnetic Layer comprising of a $CoCr_{22}Pt_{12}$ alloy, and a second magnetic layer of $CoCr_{21}Pt_{12}B_4$ alloy formed directly on the first magnetic layer (column 14, embodiment 5). However, Matsuda teaches that the first magnetic layer can suitably be formed from a CoCrPtTa alloy that additionally contains B, wherein the alloy contains 20-24 atomic % Cr, 8-20 atomic % Pt, ≤1.5 atomic % Ta, and 1-3 atomic % B (column 5, lines 1-20 and column 4, lines 52-62).

21. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a $CoCr_{24}Pt_{20}Ta_{1.5}B_3$ alloy for the $CoCr_{22}Pt_{12}$ 1st magnetic layer taught in embodiment 2 of Matsuda, as Matsuda clearly teaches that 24 atomic %Cr, 20 atomic % Pt, 1.5 atomic % Ta, and 3 atomic % B are suitable amounts of these elements for use in the first magnetic layer, and thus Matsuda recognizes the equivalence of a $CoCr_{24}Pt_{20}Ta_{1.5}B_3$ alloy and a $CoCr_{22}Pt_{12}$ alloy as suitable alloys for use as the first magnetic layer.

22. The applicant is respectfully reminded that substitution of equivalents requires no express motivation. Thus, the limitations of claim 3 are met.

23. Claim 10 requires essentially the same limitations as claim 3, except that a generic method of forming a recording medium having the same limitations as claim 3 is required. Thus, the limitations of claim 10 are met as set forth above for claim 3.

24. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda as applied to claims 1 and 8 above, and further in view of Paik et al. (IEEE Transactions on Magnetics, Vol. 28, No. 5, September 1992).

25. Matsuda as set forth above fails to teach the limitations of claims 7 and 15, which require a magnetic recording medium of claim 1 to comprise a plurality of 2nd magnetic layers, such that the 1st magnetic layer has a larger Cr content than that of the lowermost 2nd magnetic layer and contains a greater sum total of non-magnetic elements other than Cr having an atomic radius greater than Co than that of the lowest 2nd magnetic layer wherein between two adjacent 2nd magnetic layers, the Cr content and sum total content of non-magnetic elements are respectively larger for the 2nd magnetic layer disposed closer to the substrate.

26. Regarding these limitations, it is noted that Matsuda teaches that instead of forming 2 separate magnetic layers, wherein the 1st magnetic layer is a CoCrPt alloy and the 2nd magnetic layer is a CoCrPtB alloy, a magnetic layer having a composition gradient through its thickness can instead be utilized. When the gradient magnetic layer is utilized, the portion of the layer adjacent the underlayer has a composition approximating a CoCrPt alloy, and the portion of the magnetic layer farthest from the underlayer is a CoCrPtB alloy, and the composition of the layer varies continuously from the underlayer side to the surface layer side of the magnetic layer. This gradient magnetic layer exhibits fewer lattice defects and thus reduces the medium noise (column 5, lines 25-37). Matsuda teaches that a suitable CoCrPt alloy for the lower magnetic layer is a CoCrPt alloy containing 20-24 atomic % Cr, and 8-20 atomic % Pt.

27. Further, Paik teaches the impact of the concentration of Cr, Pt and B on the coercivity of CoCrPtB alloys, and teaches that a CoCrPtB alloy containing 10 atomic % Cr, 10 atomic % Pt, and 10 atomic % B exhibits a high coercivity of ~3000 kOe (page 3085, figure 2).

28. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the gradient magnetic layer taught by Matsuda such that the portion of the gradient magnetic layer closest to the substrate is a $CoCr_{24}Pt_{20}$ alloy, and a the portion of the gradient magnetic layer farthest from the substrate is formed from the $CoCr_{10}Pt_{10}B_{10}$ alloy taught by Paik et al, wherein the underlayer exhibits a compositional gradient between the $CoCr_{24}Pt_{20}$ portion to the $CoCr_{10}Pt_{10}B_{10}$ portion.

29. One would have been motivated to make this modification in light of the fact that Matsuda is particularly concerned with the medium exhibiting a high coercivity between 2.2-3.5 kOe, as stated at column 5, lines 8-10 of Matsuda. Given this fact, one would have been motivated to form the portion of the gradient magnetic layer closest to the substrate with a $CoCr_{24}Pt_{20}$ alloy, because Matsuda specifically teaches that such an alloy will not prevent the desired coercivity from being obtained. One would have been specifically motivated to utilize the $CoCr_{10}Pt_{10}B_{10}$ alloy taught by Paik to form the portion of the gradient magnetic layer furthers from the substrate in light of the fact that Matsuda desires the medium to exhibit a coercivity of 2.2-3.0 kOe, and the $CoCr_{10}Pt_{10}B_{10}$ alloy of Paik is specifically taught to exhibit this coercivity. One would have been motivated to form the composition gradient between the $CoCr_{24}Pt_{20}$ portion

of the gradient magnetic layer and the $CoCr_{10}Pt_{10}B_{10}$ portion of the gradient magnetic layer in light of the fact that Matsuda teaches that a gradient magnetic layer exhibits fewer crystal defects, and thus has lower noise.

30. It is the examiners position that when a a gradient isolation layer having a $CoCr_{24}Pt_{20}$ alloy as the lowermost portion and a $CoCr_{10}Pt_{10}B_{10}$ alloy as the uppermost portion is formed, the limitations of claim 7 is met. This is due to the fact that when a gradient between these two alloys is formed, Cr and Pt decrease as the gradient progresses from the $CoCr_{24}Pt_{20}$ portion to the $CoCr_{10}Pt_{10}B_{10}$ portion, whereas B increases with thickness in this direction. Thus, the portion of the gradient closest to the $CoCr_{24}Pt_{20}$ portion will have less Cr and non-magnetic elements other then Cr which have an atomic radius greater than Co, and as the gradient layer progresses, the layers closer to the $CoCr_{24}Pt_{20}$ portion will have a greater sum total of non-magnetic elements and Cr content then that of the layers closer to the $CoCr_{10}Pt_{10}B_{10}$ portion.

31. The limitations of claim 15 are essentially the same as claim 7 aside from the requirement of a generic method for forming the required layers. Thus, claim 15 is met as set forth above for claim 7.

32. Claims 4-5, 11-12, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda as applied to claims 1 and 8 above, and further in view of Malhotra et al. (US6303217) and Bian et al. (US5789056).

33. Matsuda as set forth above does not teach the limitations of claim 4, which requires the magnetic media of claim 1 to further comprise a first underlayer comprising a Cr based alloy on the substrate and a second underlayer comprising a Cr based alloy

disposed between the first underlayer and the first magnetic layer, wherein the second underlayer has a larger sum total content of elements other than Cr than the 1st underlayer. However, it is noted that Matsuda does teach the use of a single CrTi underlayer on a seedlayer (column 7-22 examples, and column 4, lines 45-62)

34. However, Malhotra et al. (Malhotra) teaches a magnetic recording media that comprises a substrate, a first underlayer, a second underlayer, and a magnetic recording layer deposed on the second underlayer. The first underlayer can comprise a Cr alloy that comprises between 5-30 at% of Mo, Ta, V, W, Ti etc... The second underlayer can comprise a Cr alloy that contains 5-30 at% of Mo, V, Ta, Ti, etc...or a ternary alloy of Cr that contains 5-30 at% of two elements selected from Mo, Ta, V, Ti, etc... (column 1, line 55-column 2, line 18). The magnetic layer is a cobalt based alloy, including CoCr, CoCrTa, CoCrPt, CoCrNiPtB, and other alloys containing at least 50% Co (column 4, line 19-30). This underlayer structure results in a magnetic recording media that exhibits improved signal amplitude (column 1, lines 50-53).

35. Therefore it would have been obvious to one of ordinary skill in the art to utilize a dual underlayer structure comprising two layers of CrTi as taught by Malhotra as the underlayer utilized in Matsuda, in light of the teaching Malhotra that utilizing such an underlayer structure results in a media that exhibits improved signal amplitude.

36. However, Matsuda as modified by Malhotra fails to teach that a second underlayer that contains larger amounts of elements other than Cr then the 1st underlayer.

37. Regarding this deficiency, Bian et al. teaches a magnetic recording media that comprises a substrate, a seed layer on the substrate, an underlayer on the seedlayer, and a magnetic recording layer deposited on the underlayer. The seed layer is an alloy of Cr and Ti, wherein the amount of Ti is >5at% (column 2, lines 39-63). The underlayer is comprised of a chromium alloy such as CrV_x, where x is 0-50 at% and $CrTi_y$, where y is 0-30 at% (column 3, line 66-column 4, line 2). The magnetic layer is manufactured from materials including CoCrPt and CoCrPtTa (column 4, lines 8-15). Bian et al. teaches that the amount of Ti in the seed layer affects the signal to noise ratio (S/N) of the resulting magnetic media, with a higher Ti concentration resulting in a higher S/N ratio then a lower Ti concentration (see table 2). In addition, Bian et al. teaches that the amount of Ti in the underlayer is chosen with consideration to the composition of the magnetic layer. Ideally, the lattice of the underlayer is matched to the lattice of the magnetic layer. Ti expands the Cr lattice, and so the amount of Ti present is chosen to match the lattice of the magnetic alloy utilized if or the formation of the magnetic layer.

38. Thus, the examiner takes the position that the amount of Ti in both the first underlayer (seed layer) and the second underlayer utilized by Matsuda as modified by Malhotra is a results effective variable, and it would have been obvious to one with ordinary skill in the art at the time the invention was made to optimize the concentration of Ti in each layer to achieve a desired S/N ratio and to obtain a desired level of lattice matching between the second underlayer and the 1st magnetic recording layer.

39. Claim 5 requires the 2nd underlayer to contain an element selected from Mo, Ti, V, W, and Ta. This limitation is met as set forth above for claim 4.

40. Claims 11-12 and 17-18 require essentially the same limitations as claims 4-5 aside from requiring a generic method of forming the required layers. Accordingly, the limitations of claims 11-12 and 17-18 are met as set forth above for claims 4-5.

41. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda as modified by Malhotra and Bian as applied to claims 4 and 11 above, and further in view of Bertero et al. (US6150015).

42. Matsuda as modified by Malhotra and Bian as set forth above fails to teach the limitations of claims 6 and 13, which require a Co based alloy intermediate layer between the second underlayer and the 1st magnetic layer.

43. However, Bertero et al. teaches a magnetic media the comprises a substrate, a chromium or chromium alloy underlayer on the substrate, an ultra thin nucleation layer comprising Co based alloy deposed on the underlayer, and a magnetic layer comprising a Co alloy such as CoCrPt on the nucleation layer (column 15, line 54-column 16, line 25). Magnetic media utilizing the nucleation layer exhibit drastically improved coercivity and squareness as compared to media that do not utilize the nucleation layer.

44. Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to utilize a thin nucleation layer of a Co based alloy as described by Bertero et al. between the second underlayer and the first magnetic layer described by Matsuda as modified by Malhotra and Bian.

45. One would have been motivated to make this modification due to the teaching in Bertero et al. that magnetic media that incorporate a Co based alloy as a nucleation layer exhibit drastically improved coercivity and squareness as compared to those

media that do not utilize a nucleation layer. Thus, the limitations of claims 6 and 13 are met.

Examiners Note

46. All of the references aside from the Matsuda and Zhang reference accompanied a prior office action and so have not been included with this office action.

Response to Arguments

47. Applicant's arguments filed 8/04/03 have been fully considered but they are not persuasive. In the instant case, the entirety of the applicants arguments are centered around the fact that the previously applied prior art does not teach magnetic layers that are formed directly on one another. The new grounds of rejection set forth above obviate this argument.

Conclusion

48. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 703-305-0179. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on 703-308-2367. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0389.

nju

Paul Thibodeau
Supervisory Patent E
Technology Cente